

In re Patent Application of:
SALINA ET AL.
Serial No. 10/672,925
Filing Date: SEPTEMBER 26, 2003

In the Claims:

1. (Original) A disk drive comprising:
a housing;
a rotatable data storage disk and associated disk drive motor carried by said housing for rotating said rotatable data storage disk;
a movable arm and associated arm drive motor carried by said housing for moving said arm adjacent to said rotatable data storage disk;
at least one read/write head carried by said arm;
at least one capacitor connected to a power supply; and
a driving circuit for said arm drive motor comprising
at least one output stage connected to the power supply for driving said arm drive motor, and
an auxiliary pulse width modulation (PWM) control circuit connected to said at least one capacitor for driving said at least one output stage in a PWM mode after the power supply is switched off using charge stored in said at least one capacitor.
2. (Original) The disk drive of Claim 1 wherein said at least one output stage comprises a pair of half-bridge output stages; and wherein said auxiliary PWM control circuit drives one of said half-bridge output stages in the PWM mode after the power supply is switched off.

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3. (Original) The disk drive of Claim 1 wherein said at least one output stage comprises a primary output stage for driving said arm control motor when the power supply is switched on, and an auxiliary output stage connected to said auxiliary PWM control circuit for driving said arm control motor when the power supply is switched off.

4. (Original) The disk drive of Claim 3 wherein said primary output stage comprises a full-bridge output stage, and wherein said auxiliary output stage comprises a half-bridge output stage.

5. (Original) The disk drive of Claim 1 wherein said arm drive motor comprises a voice coil motor (VCM).

6. (Original) The disk drive of Claim 1 wherein said driving circuit further comprises a charge pump circuit connected between the power supply and said at least one capacitor.

7. (Original) The disk drive of Claim 1 wherein said at least one capacitor has a capacitance value of less than or equal to about 33 μ F.

8. (Original) The disk drive of Claim 1 wherein said auxiliary PWM control circuit drives said at least one output stage until said arm drive motor moves said movable arm to a parking position.

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9. (Original) The disk drive of Claim 1 wherein said driving circuit comprises an integrated driving circuit.

10. (Original) An electronic device comprising:
a power supply;
a processor connected to said power supply; and
a disk drive connected to said power supply to be accessed by said processor, said disk drive comprising
a housing,
a rotatable data storage disk and associated disk drive motor carried by said housing for rotating said rotatable data storage disk,
a movable arm and associated arm drive motor carried by said housing for moving said arm adjacent to said rotatable data storage disk,
at least one read/write head carried by said arm,
at least one capacitor connected to said power supply, and
a driving circuit for said arm drive motor comprising
at least one output stage connected to said power supply for driving said arm drive motor, and
an auxiliary pulse width modulation (PWM) control circuit connected to said at least one capacitor for driving said at least one output stage in a PWM mode after said power supply is

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switched off using charge stored in said at least one capacitor.

11. (Original) The electronic device of Claim 10 wherein said at least one output stage comprises a pair of half-bridge output stages; and wherein said auxiliary PWM control circuit drives one of said half-bridge output stages in the PWM mode after said power supply is switched off.

12. (Original) The electronic device of Claim 10 wherein said at least one output stage comprises a primary output stage for driving said arm control motor when said power supply is switched on, and an auxiliary output stage connected to said auxiliary PWM control circuit for driving said arm control motor when said power supply is switched off.

13. (Original) The electronic device of Claim 12 wherein said primary output stage comprises a full-bridge output stage, and wherein said auxiliary output stage comprises a half-bridge output stage.

14. (Original) The electronic device of Claim 10 wherein said arm drive motor comprises a voice coil motor (VCM).

15. (Original) The electronic device of Claim 10 wherein said driving circuit further comprises a charge pump

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circuit connected between said power supply and said at least one capacitor.

16. (Original) The electronic device of Claim 10 wherein said at least one capacitor has a capacitance value of less than or equal to about 33 μ F.

17. (Original) The electronic device of Claim 10 wherein said auxiliary PWM control circuit drives said at least one output stage until said arm drive motor moves said movable arm to a parking position.

18. (Original) The electronic device of Claim 10 wherein the electronic device comprises a portable electronic device, and wherein said disk drive comprises a micro-disk drive.

19. (Original) The electronic device of Claim 10 wherein said driving circuit comprises an integrated driving circuit.

20. (Original) A driving circuit for a read/write arm drive motor of a disk drive comprising at least one capacitor connected to a power supply, the driving circuit comprising:
at least one output stage connected to the power supply for driving the arm drive motor; and
an auxiliary pulse width modulation (PWM) control circuit connected to said at least one capacitor for driving said

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at least one output stage in a PWM mode after the power supply is switched off using charge stored in said at least one capacitor.

21. (Original) The driving circuit of Claim 20 wherein said at least one output stage comprises a pair of half-bridge output stages; and wherein said auxiliary PWM control circuit drives one of said half-bridge output stages in the PWM mode after the power supply is switched off.

22. (Original) The driving circuit of Claim 20 wherein said at least one output stage comprises a primary output stage for driving the arm control motor when the power supply is switched on, and an auxiliary output stage connected to said auxiliary PWM control circuit for driving the arm control motor when the power supply is switched off.

23. (Original) The driving circuit of Claim 22 wherein said primary output stage comprises a full-bridge output stage, and wherein said auxiliary output stage comprises a half-bridge output stage.

24. (Original) The driving circuit of Claim 20 wherein said at least one capacitor has a capacitance value of less than or equal to about 33 μ F.

25. (Original) A method for driving a read/write arm drive motor of a disk drive comprising:

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driving the arm drive motor using at least one output stage when a power supply connected thereto is switched on;

charging at least one capacitor connected to the power supply when the power supply is switched on; and

driving the at least one output stage in a pulse width modulation (PWM) mode after the power supply is switched off using charge stored in the at least one capacitor.

26. (Original) The method of Claim 25 wherein the at least one output stage comprises a pair of half-bridge output stages; and wherein driving the at least one output stage in a PWM mode comprises driving one of the half-bridge output stages in the PWM mode after the power supply is switched off.

27. (Original) The method of Claim 25 wherein the at least one output stage comprises a primary output stage for driving the arm control motor when the power supply is switched on, and an auxiliary output stage for driving the arm control motor when the power supply is switched off.

28. (Original) The method of Claim 27 wherein the primary output stage comprises a full-bridge output stage, and wherein the auxiliary output stage comprises a half-bridge output stage.